

NOTES ON SEASONAL ACTIVITY AND RELATIVE ABUNDANCE OF ADULT BLACK LEGGED TICKS, *IXODES SCAPULARIS* (ACARI: IXODIDAE), IN MISSISSIPPI^{1,2}

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ABSTRACT: For two years (October-May 1983-84, 1984-85), *Ixodes scapularis* specimens were collected weekly by drag cloth in the 42,000 acre Noxubee National Wildlife Refuge in north central Mississippi, with occasional collecting trips throughout the state for comparison. A total of 105 drag cloth hours yielded 104 specimens. Additionally, 90 white-tail deer were examined for specimens in the fall of 1983 at the Noxubee hunter check station. Seasonal activity and relative abundance of *I. scapularis* is reported for the study area, including the Rocky Mountain Laboratory records for this species in Mississippi.

Ixodes scapularis Say, the black-legged tick, is the third most common ixodid tick affecting livestock in several south central states (Harris, 1959; Barnard, 1981; and Drummond, 1967). Adults of this species are relatively abundant in winter and early spring whereas immatures may be found on various hosts throughout the year (Bishopp and Trembley, 1945). There have been three reports on the biology of *I. scapularis* (Harris, 1959; Rogers, 1953; Hooker et al. 1912).

Seasonal activity, geographic distribution, and relative abundance of *I. scapularis* in Mississippi is mostly unreported. Specimens were collected from white-tail deer by Kellogg et al. (1971) but locality, seasonal data, and numbers per host were not given. Smith (1977) reported deer infestations with ticks (including *I. scapularis*) in Mississippi but numbers per deer and seasonal distribution was not included. Also, in an unpublished study of the stress responses of white-tail deer, Demarais (1984) provided numbers of *I. scapularis* per deer bimonthly for three wildlife management areas in north, central and south Mississippi. The purpose of this current study was to better define the population levels and seasonal distribution of adult *I. scapularis* in Mississippi.

MATERIALS AND METHODS

From October 30 to May 15 in 1983-84 and 1984-85, *Ixodes scapularis* specimens were collected by drag cloth in the 42,000 acre Noxubee National Wildlife Refuge in north central Mississippi. Efforts

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were made to collect weekly except when there were no days in a week with temperatures above 10°C. Noxubee refuge extends from northern Noxubee County into Winston and Oktibbeha counties in Mississippi and exhibits an oak-hickory-pine forest with about three fourth's of the area forested. The majority of drag cloth samples were taken from an area of mature pine-hardwoods containing dogwood, wild blueberry or huckleberry, sweetgum and predominantly short leaf pine and southern red oak. Mississippi, as a whole, and especially the wildlife refuge areas, contain very large white-tail deer populations.

For comparison, frequent collections were also made from sites in north, central, and south Mississippi (excluding the Delta region). Additionally, *I. scapularis* specimens were removed from white-tail deer at the Noxubee hunter check station from November 21, 1983 to January 1, 1984. Representative specimens from all collections were keyed using Keirans and Clifford (1978). Voucher specimens are deposited in the Mississippi Entomological Museum at Mississippi State University. In addition to these new data, the Rocky Mountain Laboratory records for *I. scapularis* in Mississippi are reported here.

RESULTS AND DISCUSSION

In this study 105 drag-cloth-hours yielded 104 *I. scapularis* specimens with an overall average of about 1 tick per hour. In 1983-84, 69 drag cloth hours produced 57 ticks with a peak of 4 per hour in the second week of February (Fig. 1). In 1984-85, 47 *I. scapularis* were collected in a total of 36 drag-cloth-hours. The 1984-85 peak in the study area was also 4 per hour in the third week of February. Adult activity diminished by mid May.

Collecting attempts in other sites throughout Mississippi produced results similar to that of the study area. Ten trips to northeastern Mississippi and west central Mississippi on a variety of dates in both years yielded no ticks. One trip to central Mississippi in January 1985 produced 0.75 ticks per hour, whereas another trip to the same area in February yielded 5.6 ticks per hour. One trip to southeast Mississippi in February yielded 2 *I. scapularis* specimens per drag cloth hour.

White-tail deer infestations with *I. scapularis* ranged from 0-3 ticks per animal with only 13/90 (14%) deer parasitized. Twenty seven specimens were removed from 90 deer (avg. 0.3 ticks per animal) from November to January. Smith (1977) reported that 94% of 143 deer examined from 22 Mississippi counties (18 of which are in south Mississippi) were infested with *I. scapularis*. Demarais (1984) found results similar to ours for the Noxubee Refuge with 1.0 *I. scapularis* specimens per adult deer in December and January, and an increase in total prevalence of *I. scapularis*

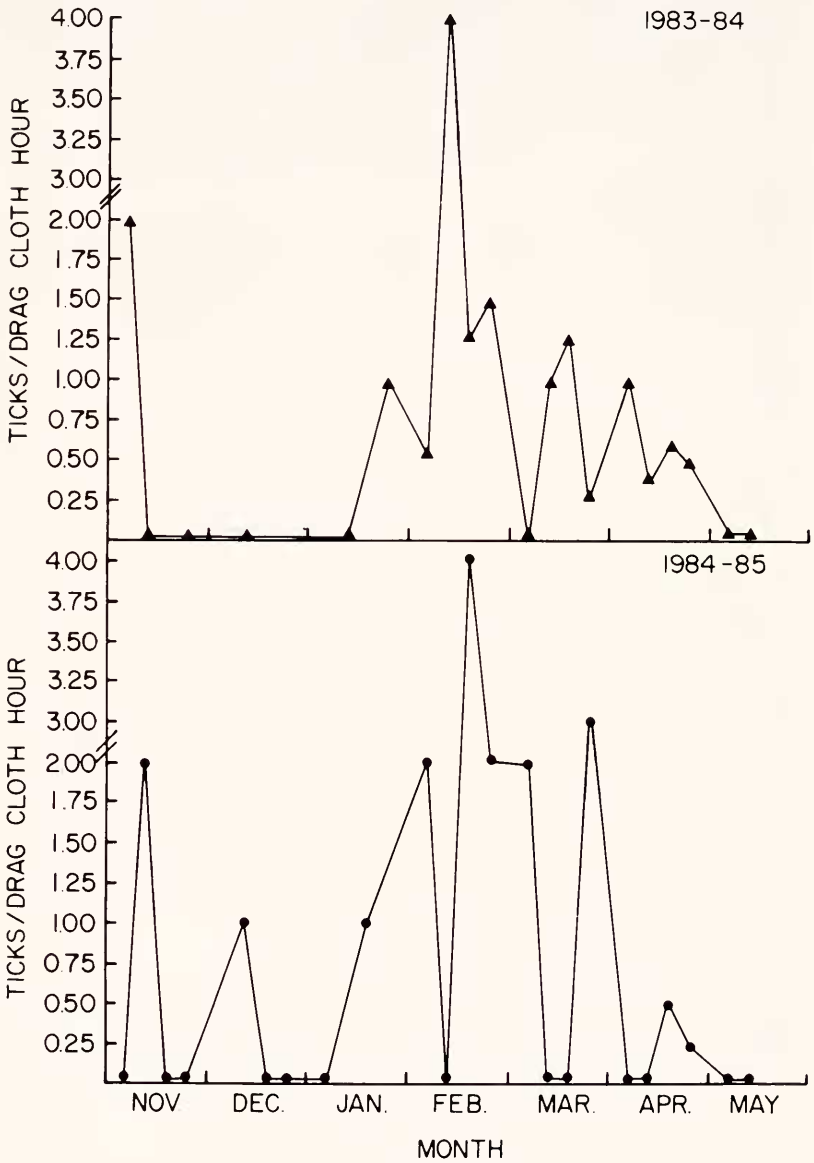


Figure 1. Seasonal distribution of *Ixodes scapularis* in north central Mississippi collected by drag cloth (Oct-May 1983-84 and 1984-85).

on deer southward with 13, 31, and 50% for his north, central, and south Mississippi study areas respectively.

There are a total of 15 records of *I. scapularis* from Mississippi in the Rocky Mountain Laboratory tick collection records. Collection dates range from November 5 to May 21 from the following south or central Mississippi counties: Bolivar, Copiah, Forrest, Franklin, Harrison, Holmes, Jackson, Wilkinson, and Yazoo.

The relative abundance data presented here are basically consistent with that of the other works cited above; however, these data may indicate lower population levels of *I. scapularis* in northern Mississippi than in Arkansas or eastern Oklahoma, which are on the same latitude and increasingly larger populations of *I. scapularis* toward the southern end of the state. Whether this gradient of *I. scapularis* prevalence is related to deer populations, climatic differences, availability of hosts for the immatures, or interactions of all three, is not clear but warrants further investigation. Seasonally, these records indicate a peak of activity in mid-February which is not consistent with that of 4 other studies which reported peaks in October or November (Barnard, 1981; Lancaster, 1973; Koch, 1982; and Drummond, 1967); however, it is possible that *I. scapularis* activity exhibits a bimodal pattern with reduced activity in mid-winter. These observations suggest that *I. scapularis* does not occur in northern Mississippi in sufficient numbers to cause significant losses in wild or domestic animal populations but may be an important pest in southern Mississippi.

ACKNOWLEDGMENTS

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SOCIETY MEETING OF OCTOBER 16, 1985

Roger W. Fuester, president of the Society and Research Entomologist at the USDA Beneficial Insects Laboratory in Newark, Delaware, was the featured speaker at the first meeting of the 1985-86 year. Ten members and three guests attended the meeting which was held in Townsend Hall on the University of Delaware campus. President Fuester's talk was entitled "Biological Control of the Birch Leafminer."

The larvae of the tenthredinid sawfly *Fenusa pusilla* mine the leaves of birch trees in the northeastern United States from Minnesota to Maine and in the Pacific Northwest. While this species is primarily a pest of ornamental trees in the U.S., in Canada, where birches are more abundant, it is a forest pest. Infestations can exceed 50% of the leaves, causing the leaves to turn brown and drop. The weakened trees are predisposed for attack by the bronze birch borer, *Agilus anxius*. The birch leafminer was first discovered in Connecticut in 1923 where it had been accidentally introduced, presumably from Europe. Recently four parasites with different life histories and habitat preferences have been introduced to control the miner. Three of these, *Lathrolestes nigricollis*, *Gryptocentrus albipes*, and *Chrysocharis laricinellae*, have become locally established with the greatest success being with releases in the Pocono mountains of Pennsylvania. Compared to other release sites, climate of this region more closely matches that of the region of Europe where the parasites originated. It is hoped that through natural selection the species will adapt to varied climates and expand their ranges to provide biological control of the birch leafminer.

President Fuester's illustrated talk not only addressed the specific topic of the control of the birch leafminer but also provided a good general discussion of the characteristics of introduced pests, the strategy in obtaining suitable parasites, and the problems associated with culturing and establishing parasites. The talk also was interspersed with interesting notes on the history of biological control.

Howard Boyd displayed an intriguing spherical clay ball about 4 cm in diameter that had been found attached to the thin stem of an ornamental plant in Shamong Township, NJ. From it had hatched one ichneumonid and 7 small vespid wasps. None of the gathered entomologists had seen such a nest before. The vespids were subsequently determined to be in the genus *Eumenes* by Dr. Dewey Caron. The specimens were deposited in the University of Delaware collection.

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